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NASA TECH BRIEF

Manned Spacecraft Center

Propulsion Sizing Program

The problem:

To identify and evaluate auxiliary propulsion system (APS) concepts, and to perform, for the more attractive of these, an in-depth design and performance analysis.

The solution:

A computer program was written to evaluate and define optimum design parameters of a low pressure APS. The APS will provide attitude and translational control of a NASA Space Shuttle Vehicle.

How it's done:

The program evaluates, for various space shuttle performance requirements, the optimum subsystem design parameters such as engine chamber pressure, mixture ratio, expansion ratio, and component/subsystem weight and size. APS design point and sensitivities to design parameters and/or mission requirements can be obtained quickly with the program.

The documentation consists of two volumes. Volume I contains a complete technical description of the APS including a description of subsystem operation; subsystem/assembly design descriptions; delineation of the engineering analysis equations, including substantiation of data; and sample cases showing program input/output. Volume II contains a program description and internal program nomenclature including a description of variable names and a detailed flow chart.

The program could be revised to evaluate and optimize oxygen and hydrogen subsystem concepts for fuel cell and environmental control in space vehicles.

Notes:

1. This program is written in FORTRAN IV to be utilized on the CDC-6600 computer.
2. Inquiries concerning this program should be directed to:

   COSMIC
   112 Barrow Hall
   University of Georgia
   Athens, Georgia 30601
   Reference: MSC-14016

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